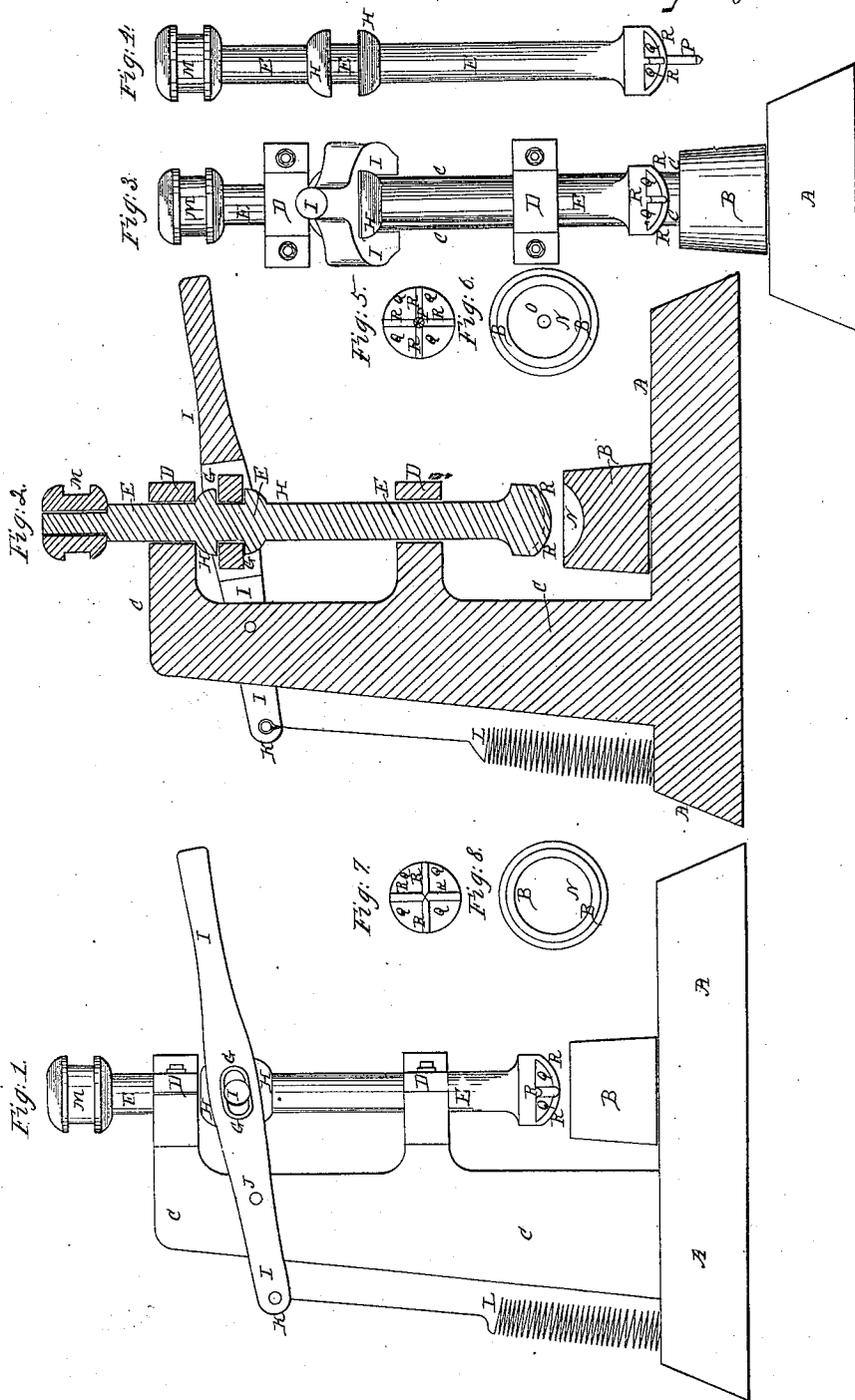


Miller & Whitehead,

Sheet-Metal Die.

No 14,878.

Patented May 13, 1856.



UNITED STATES PATENT OFFICE.

S. B. MILLER AND E. W. WHITEHEAD, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN WORKING SHEET METAL.

Specification forming part of Letters Patent No. 11,878, dated May 13, 1856.

To all whom it may concern:

Be it known that we, SYLVESTER B. MILLER and EZRA W. WHITEHEAD, of the city of Newark, county of Essex, and State of New Jersey, have invented a new and useful improvement in machines for forming concentric surfaces in metals, such as dishes, lamp and candlestick bottoms, and other analogous shapes; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same.

The nature of our improvement consists in substituting pressure and rotation to one of the dies, instead of a drop and percussion force, as heretofore used, for forming and stretching the material. It is to be understood that the improvement relates to making forms that are concentric to the axis of rotation of the die. The drop and percussion process makes it necessary to have a firm and solid bed to resist the blows, involving material expense in the machinery, and is likely to damage the work if it is deep and the material lacking in ductility, often requiring a number of successive dies and blows, consuming time and power to a great extent, whether the drop-screw or lever press is used for the purpose. As percussion acts by impulse or reciprocation, it is not so easily graduated in its action for stretching the material to be formed as by rotation and gradual pressure. The rotation of the die aids the pressure in stretching the material gradually to meet the depth of the die by using a less number of dies than in the old plans. Percussion or pressure alone will tear or otherwise fracture the metal if the blow extends beyond its stretch or ductility before it comes in contact with the under die; hence a graduated succession of dies is required, each one being within the limit of the ductility of the metal. As rotary motion and pressure act gradually and not suddenly, as in percussion, a less number of dies will answer in our improved plan than in the old plans, besides admitting of using a material inferior in ductility to what is required in the drop and other presses, allowing the use of any number of dies in one machine that may be desirable to act at the same time, the whole being arranged with less difficulty and expense than can be done by the drop and other presses, and the

work executed with greater rapidity, with less power, and of a better quality. As the male die performs most of the stretching, a mere ring will answer for the female die in some kinds of work in our improved plan to sustain the material operated upon, as the pressure is gradual. The ring supporting the material at the outer edge of the depression holds it up, and a shoulder on the outer edge of the male die comes in contact with the metal resting upon the female die and stops its descent, truing the edge around the depression, and making less expense for the female die than is required in the drop plan, as in the latter case a perfect fit between the whole surfaces must be made between the two dies. In the drop press, this shoulder, in falling upon the material, tends to thin the metal at this part, and unless guarded by this shoulder would destroy the metal by making a puncture; whereas, in the improved plan, the depression being gradual, no such effect is produced. This thinning of the metal exterior to the depression is objectionable in work requiring a true face. This is an additional modification of the dies, costing less than full or solid sets.

The annexed drawings make a part of this specification, in which Figure 1 is a side elevation of the entire machine, showing the die raised up ready to receive the material. Fig. 2 is a sectional elevation through the middle from front to rear. Fig. 3 is a front view from right to left. Fig. 4 is the male die and spindle, separate from the machine. Fig. 5 is the depressing or countersinking face of the male die, with a punch or drill attached for making an aperture in the depression when needed. Fig. 6 is the depressed or countersinking face of the female die, with a hole in the center to match the drill or punch in the male die, thus making the depression and puncture at one operation. Fig. 7 is the depressing or countersinking face of the male die without a drill attachment. Fig. 8 is the depressed or countersunk face of the female die without any aperture, these dies being designed for work with full faces. Countersinking in the sense here used is not cutting out and removing the material, but is depressing it to a definite shape.

Like letters refer to like parts throughout the drawings.

A A is the base of the machine; B B, the fe-

male die resting upon it. The countersink depression in this case is a section of a sphere for a pattern. Other patterns admitting of the rotation of one of the dies can be used.

C is the standard for sustaining the male die and its spindle. Other means may be adopted for holding the spindle and die, as in some cases greater space may be needed between them and the standard.

D D are the guides for attaching the spindle to the standard, and to allow of free rotation and ease of up-and-down motion.

E E are the bearings of the spindle guiding the male die to a proper contact with the female die.

F is the bearing or swivel journal for raising and depressing the spindle, and still allow it to rotate.

G is the swivel which embraces the spindle at F.

H H are the collars of the swivel-journal F.

I is the lever for working the spindle up and down. This swivel embraces the spindle, allowing it to rotate freely, bearing against the collars in lifting it up and down, and is placed in a suitable opening in the lever, and is attached to it by suitable arms or projections I', projecting through the oblong holes in the sides of the opening in the lever.

J is the fulcrum of the lever, and K the end of it.

L is a spiral spring for raising the spindle through the lever, it being pulled down by hand in this case. When desired, it can be made self-acting.

M is a pulley to work the spindle by a belt.

N is the depression or form of the face of the female die.

O is the punching or drilling hole in Fig. 6.

P is the drill in Figs. 4 and 5. The drill and hole must be so made as to not obstruct the working of the dies, and at the same time make a smooth hole.

Q Q is the face of the male die.

R R are ridges raised upon the face of the male die and rounded on their edges, so as to not cut or otherwise injure the material. These ridges may be made narrow or wide, curved, or straight from the center out. The wide face-ridges are less likely to abrade or disfigure the material. In some cases it may be necessary to use the face smooth, owing to the delicacy of the work. The ridges are preferable where admissible, as they produce the effect with less pressure, operating upon less surface at a time, causing it to stretch easier, as well as sink under the pressure and rotation of the die.

The first cost of construction, as well as in working our improved plan, is less than in the old plans.

We do not claim a rotating die or countersink for making depressions by cutting and removing the material, as the means for doing so are well known, and are for another purpose.

We claim—

The employment of the die E, when constructed as described and used in connection with the lower die, N, for extending or stretching thin metal plate by pressure and rotary motion combined.

SYLVESTER B. MILLER.
EZRA W. WHITEHEAD.

Witnesses:

JOHN H. TIMS,
THEODORE M. TIMS.